

Feasibility of the ToyBox-Scotland obesity prevention intervention in preschools: Results of a cluster randomised controlled trial

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Introduction

Childhood overweight and obesity rates are high in Scotland¹.

Preschool settings present an opportunity to target the energy-balance related behaviours (e.g., physical activity, sedentary behaviour, unhealthy snacking) associated with childhood obesity².

The ToyBox preschool obesity prevention intervention³ was adapted to the Scottish preschool setting⁴.

This study aimed to test the feasibility of the adapted ToyBox intervention in preschools in Glasgow, UK.



Methods

Design: Feasibility cluster randomised controlled trial (3 intervention preschools vs 3 usual care control preschools)

Setting & participants: 3-5 year old children attending local authority preschools in Glasgow, UK.

Intervention: 18 week preschool and home-based intervention. The major components of the intervention included:

1. Preschool physical activity sessions (~1 hour per week)
 2. Preschool movement breaks and “movement corners”
 3. Environmental changes to the preschool classroom
 4. Interactive parent/child homework games and sticker incentives
- Structure and content of the intervention detailed below (figure 1).

Measures: Bioelectrical impedance (BIA), height and weight measured by trained fieldworker. Physical activity (PA) and sedentary time (ST) measured via activPal accelerometer. Snacking and water consumption measured via parental questionnaire.

Primary outcome: Feasibility parameters (recruitment/retention rates, acceptability of secondary outcome measures, SDs/IQRs/95% CIs of secondary outcome measures).

Secondary outcomes: 1. Anthropometry (BMI z score; BIA) 2. PA (total daily; steps per day) and ST (hours).

Data analysis: Summary statistics and proportions describe data. Student t-tests and X² test used to compare sample characteristics. Level of significance set at p≤0.05. Study is underpowered for inferential statistics. Analysis was conducted using IBM SPSS v25.

Figure 1. ToyBox Scotland structure

Week	Implementation phase (January 2018 to June 2018)							
	First phase				Repetition phase			
	4 weeks		4 weeks		2 weeks		2 weeks	
Nursery Focus	PHYSICAL ACTIVITY		SEDENTARY BEHAVIOUR		PHYSICAL ACTIVITY		SEDENTARY BEHAVIOUR	
Home Focus	WC	PA	DN	SB	WC	PA	DN	SB

WC = water consumption, PA = physical activity, DN = diet & nutrition, SB = sedentary behaviour.

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Results

Cluster-level response rate = 10% (11/112 preschools).

Study recruitment rate = 18% (42/233 children, Mean age 4.4±0.46 years, 40% girls).

Study retention rate = 86% (36/42 children provided at least one valid measurement at baseline and follow-up).

Height/weight measurements were feasible and acceptable. BIA was not feasible due to poor participant compliance with protocol.

61% of sample provided valid accelerometer data for baseline; 21% for baseline and follow-up.

Parental questionnaire response rates = 24%.

Table 1 presents the observed changes in measured outcomes for both the intervention and control group.

Pre and post-results	Intervention			Control		
	Baseline	Follow-up	Mean Change (99% CI)	Baseline	Follow-up	Mean Change (95% CI)
BMI z-score	0.41 (1.16)	0.43 (1.09)	0.02 (-0.11, 0.15)	0.35 (1.17)	0.41(1.07)	0.06 (-0.04, 0.15)
Total daily PA (min)	163.1 (29.7)	146.3 (31.3)	-16.8	151.4 (39.7)	127.7 (27.1)	-23.7
Total daily ST (hours)	7.0 (1.2)	8.7 (0.9)	1.7	6.6 (1.2)	7.2 (0.6)	0.56
Total daily steps (count)	11436.9 (2351.2)	10217.3 (2235.7)	-1219	10827.5 (2894.6)	8974.7 (2334)	-1852.8

Table 1. Anthropometric, PA and ST outcomes

Process evaluation: Preschool practitioners (n=9) reported that the ToyBox programme and materials were a valuable resource which made delivering PA sessions easier during post-intervention focus groups. Stakeholder involvement in intervention development was deemed beneficial to user-friendliness of materials.

The intervention was implemented with high fidelity (>70%) in all Intervention preschools.

Discussion and recommendations

Toybox-Scotland is feasible and acceptable in Scottish preschools.

More efforts to maximise participant recruitment, retention and adherence to accelerometer protocols should be implemented in any future efficacy/effectiveness trials.

References:

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